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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,447	12/19/2001	James G. Fleming	SD6942/S97581	6659
7590	01/28/2004		EXAMINER	
Sandia National Laboratories P.O. Box 5800 - MS-0161 Albuquerque, NM 87185-0161			PAK, SUNG H	
			ART UNIT	PAPER NUMBER
			2874	
			DATE MAILED: 01/28/2004	

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/025,447	FLEMING ET AL.
Examiner	Art Unit	
Sung H. Pak	2874	

-- The MAILING DATE of this communication appars on the cover sheet with the correspondence address --

### **P riod for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on 20 October 2003.

2a)  This action is **FINAL**.                            2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## **Disposition of Claims**

4)  Claim(s) 1-23 and 44-47 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5)  Claim(s) \_\_\_\_\_ is/are allowed.

6)  Claim(s) 1-23, 44-47 is/are rejected.

7)  Claim(s) \_\_\_\_\_ is/are objected to.

8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All b)  Some \* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

13)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a)  The translation of the foreign language provisional application has been received.

14)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1)  Notice of References Cited (PTO-892) 4)  Interview Summary (PTO-413) Paper No(s). \_\_\_\_ .  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948) 5)  Notice of Informal Patent Application (PTO-152)  
3)  Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ . 6)  Other: \_\_\_\_ .

## DETAILED ACTION

Applicant's amendment received on 10/20/2003 has been entered, and the pending claims have been carefully reconsidered. The claims have been reviewed in light of the arguments set forth in the applicant's response, however they are still unpatentable in view of the prior art. The previous ground of rejection is upheld by the present office action and the rejection is made final. Please refer to Remarks for further details.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-10, 12-22, 44-47 are rejected under 35 U.S.C. 102(e) as being anticipated by Huber et al (US 2003/0035613 A1) as discussed in the previous office action.

Huber et al reference discloses an optical device with all the limitations set forth in the claims, including: a trench having a hollow core (filled with air or gas having a refractive index lower than the cladding) embedded in a silicon substrate (paragraph 0029, 0030); a multi-layer dielectric cladding disposed on the inner wall of the trench,

such that the light wave is being guided via internal reflection in the core region with a minimal loss (paragraph 0029); the hollow core having a cross-section of dimension as low as 4 microns (paragraph 0036). Although Huber et al reference does not explicitly state that the multi-layer dielectric cladding comprises alternating layer of high and low refractive index dielectric material, such multi-layer dielectric reflecting surfaces are typically alternating high and low refractive index materials. Therefore, Huber et al inherently discloses a dielectric cladding with alternating high and low refractive index materials.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-10, 12-22 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Huber et al (US 2003/0035613 A1) in view of Laakmann (US 4,688,893) as discussed in the previous office action.

As discussed above, Huber et al reference discloses an optical device with all the limitations set forth in the claims. However, if the applicants believe that alternating high and low dielectric materials are not inherently disclosed by the reference, the claims are alternatively rejected under 35 USC 103(a).

Huber et al reference discloses an optical device with all the limitations set forth in the claims as discussed above, except it does not explicitly mention the use of dielectric multi-layer with alternating high and low refractive index materials. However the use of alternating high and low refractive index materials for waveguide cladding is known in the art as taught by Laakmann (US 4,688,893) (column 3 lines 25-31). Laakmann teaches that such a dielectric cladding is advantageous because it allows for a cladding with high reflectivity. Therefore, it would have been obvious to a person of ordinary skill in the art to modify Huber et al device to have a multi-layer dielectric cladding with alternating high and low refractive index materials.

Claims 11, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huber et al (US 2003/0035613 A1) as discussed in the previous office action.

Huber et al reference discloses an optical device with all the limitations set forth in the claims as discussed above, except it does not teach filling the core area with

material having a refractive index higher than the dielectric cladding. However, filling the core area of a waveguide with material having a refractive index greater than the cladding is well known and commonly taught in the waveguide art. Such a core material allows light (especially light with shorter wavelengths) to be efficiently confined in the core area. Therefore, it would have been obvious to a person of ordinary skill in the art to modify Huber et al device to have a core material having a refractive index greater than the dielectric cladding.

### ***Remarks***

Response to arguments:

Starting on page 7 of the applicant's response, it is argued that the cited references do not disclose a closed trench having a continuous dielectric coating that is deposited conformably on the inner wall of the hollow core (page 7 paragraphs 2-3). The examiner respectfully disagrees, and submits that the references fully read on the claims as currently written.

The disclosure of the present application shows a trench closed by a layer or a wall having a hole therein (Fig. 3c, Fig.4d, Fig. 5f-g). Huber et al reference (US 2003/0035613 A1) discloses a completely closed trench (Fig. 7f and Fig. 7h) having a hollow core therein. The disclosure of the present application shows a continuous dielectric layer deposited conformably on the inner walls of the hollow core, except on the wall having a hole where the continuity is broken (Fig. 3d, Fig. 4d. Fig. 5f-g; Although Fig. 3d appears to have a complete continuity, the "gas inlet" is not shown in

the figure where the continuity is broken- see page 12 lines 27-29 of the specification).

Similarly, Huber et al reference discloses a closed trench having a hollow core comprising three inner walls. The multiplayer dielectric cladding is deposited continuously and conformably on the inner walls of the hollow core (Fig. 7h). Therefore, Huber et al reference fully reads on the claimed limitations as currently written and the claim rejection is proper.

### ***Conclusion***

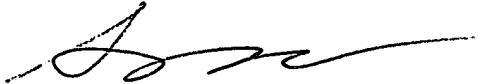
**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (703) 308-4880. The examiner can normally be reached on Monday - Thursday : 6:30am-5:00pm.

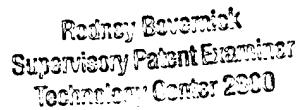
The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

  
Sung H. Pak  
Examiner  
Art Unit 2874

sp



  
Rodney Bevernick  
Supervisory Patent Examiner  
Technology Center 2800